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EXAMINER

MARIAM, DANIEL G

ART UNIT PAPER NUMBER

2624

DATE MAILED: 10/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/616,671

Applicant(s)

PAN ET AL.

Examiner

DANIEL G. MARIAM

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-25,31,32,38 and 39 is/are rejected.
- 7) ☒ Claim(s) 26-30,33-37 and 40-44 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Objections

1. Claims 6, 14, and 22 are objected to because of the following informalities: both claims do not end with a period. Each claim begins with a capital letter and ends with a period. Periods may not be used elsewhere in the claims except for abbreviations (See MPEP 608.01(m)). Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 24 and are rejected under 35 U.S.C. 102(b) as being anticipated by Pan (6,115,446).
4. With regard to claim 24, Pan discloses a method of reconstructing a tomographic image from data acquired with a fan beam configuration with constant or spatial variant focal lengths (See for example, Figs. 6-8), such method comprising the steps of: performing a fast Fourier transform on the fan beam data with respect to a set of view angles (See for example, col. 1, lines 49-51); forming a linear combination of complementary data elements of the transformed data, lying at complementary projection angles (See for example, col. 1, lines 52-54); filtering the linear combination of complementary data elements in the spatial domain and reconstructing an image from the filtered linear combination of complementary data elements using a filtered backprojection algorithm (Col. 1, lines 52-60).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-2, 5-10, 13-18, and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harman (5,406,479) in view of Defrise (A Cone-beam reconstruction algorithm using shift variant filtering and cone-beam backprojection).

With regard to claim 1, Harman discloses a method of reconstructing a tomographic image from fan-beam or cone beam data (See for example, col.4, lines 1 -9), such method comprising the steps of: collecting fan-beam or cone-beam data over an image space, converting the fan-beam to parallel-beam data with respect to a rotation angle within the image space or converting the cone-beam data to parallel fan-beam data (See for example, col. 6, line 59 -col. 7, line 4; col. 4, lines 48-58; and col. 11, lines 11-20); performing a shift (variant) filtration of the parallel-beam data within the image space (col. 4, lines 64-col. 5, line 1; and col. 11, lines 21-47); and converting the processed data to images through backprojection or other means (See, for example, col. 5, lines 1-18; and col. 11, lines 48-51). Harman does not expressly call for a shift variant filtration of the beam. However, Defrise (See for example, section II (D)) teaches this feature. Therefore, it would have been obvious to one having ordinary skill in the art to incorporate the teaching as taught by Defrise into the system of Harman, if for no other reason

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than to provide a shift variant filter, and to do so would at least enhance/improve the image by correcting defects or errors in portions of the image.

With regard to claim 2, the method of reconstructing the tomographic image as in claim 1 further comprising reconstructing an image from the filtered parallel-beam data using a filtered backprojection algorithm (See for example, col. 3, lines 5-7 of Harman; and Abstract of Defrise).

With regard to claim 5, the method of reconstructing the tomographic image as in claim 1 further comprising defining the fan-beam or cone-beam data as data collected from an object that is offset within the data space (See for example, Figs. 4A, 4C, and 4E of Harman).

With regard to claim 6, the method of reconstructing the tomographic image as in claim 1 further comprising performing a Fourier expansion on the data with respect to a rotation angle (col. 16, lines 21-29 of Harman).

With regard to claim 7, the method of reconstructing the tomographic image as in claim 6 further comprising linearly shifting the transformed data (broadly reads on col. 16, lines 28-29 of Harman).

With regard to claim 8, the method of reconstructing the tomographic image as in claim 7 further comprising performing an inverse Fourier transform on the shifted data (See for example, item 90, in Fig. 5).

Claims 9, 10, 13, 14, 15, 16 are rejected the same as claims 1, 2, 5, 6, 7, and 8 respectively except claims 9, 10, 13, 14, 15, 16 are directed to apparatus claims. Thus, argument analogous to those presented above for claims 1, 2, 5, 6, 7, and 8 are respectively applicable to claims 9, 10, 13, 14, 15, 16.

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Claims 17, 18, 21, 22 and 23 are rejected the same as claims 1, 2, 5, 6 and 8 respectively except claims 17, 18, 21, 22 and 23 are directed to apparatus claims. Thus, argument analogous to those presented above for claims 1, 2, 5, 6 and 8 are respectively applicable to claims 17, 18, 21, 22 and 23.

7. Claims 24-25, 31-32, and 38-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (6,115,446) in view of Defrise (A Cone-beam reconstruction algorithm using shift variant filtering and cone-beam backprojection).

With regard to claim 24, Pan discloses a method of reconstructing a tomographic image from data acquired with a fan beam configuration with constant or spatial variant focal lengths (See for example, Figs. 6-8), such method comprising the steps of: performing a fast Fourier transform on the fan beam data with respect to a set of view angles (See for example, col. 1, lines 49-51); forming a linear combination of complementary data elements of the transformed data, lying at complementary projection angles (See for example, col. 1, lines 52-54); (filtering) the linear combination of complementary data elements in the (spatial domain) and reconstructing an image from the filtered linear combination of complementary data elements using a filtered backprojection algorithm (Col. 1, lines 52-60). . Pan does not expressly call for a filtering the data elements in he spatial domain. However, Defrise (See for example, section II (D), page 188) teaches this feature. Therefore, it would have been obvious to one having ordinary skill in the art to incorporate the teaching as taught by Defrise into the system of Pan, if for no other reason than to provide a spatial filter, and to do so would at least enhance/improve the image by correcting defects or errors in portions of the image.

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With regard to claim 25, the method of reconstructing a tomographic image as in claim 24 wherein the step of filtering further comprises using shift variant filtration (See section II (d), page 188 of Defrise).

Claims 31 and 32 are rejected the same as claims 24 and 25 respectively except claims 31 and 32 are directed to apparatus claims. Thus, argument analogous to those presented above for claims 24 and 25 are respectively applicable to claims 31 and 32.

Claims 38 and 39 are rejected the same as claims 24 and 25 respectively except claims 38 and 39 are directed to apparatus claims. Thus, argument analogous to those presented above for claims 24 and 25 are respectively applicable to claims 38 and 39.

8. Claims 3-4, 11-12 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harman in view of Defrise as applied to claims 1-2, 5-8 above, and further in view of Pan (6,324,242).

With regard to claim 3, Harman (as modified by Defrise) discloses all of the claimed subject matter as already discussed above for claim 1, and incorporated herein by reference. Harman (as modified by Defrise) does not expressly call for defining the fan/cone beam data as a half-scan fan beam data. However, Pan (col. 2, lines 40-42) teaches this feature. Therefore, it would have been obvious to one having ordinary skill in the art to employ the teaching as taught by Pan into the system of Harman (as modified by Defrise), and to do so would at least minimize the processing time taken during full scanning.

With regard to claim 4, the method of reconstructing the tomographic image as in claim 1 further comprising further comprising defining the fan-beam data as helical scan data (See for example, col. 11, line 61).

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Claims 11 and 12 are rejected the same as claims 3 and 4 respectively except claims 11 and 12 are directed to apparatus claims. Thus, argument analogous to those presented above for claims 3 and 4 are respectively applicable to claims 11 and 12.

Claims 19 and 20 are rejected the same as claims 3 and 4 respectively except claims 19 and 20 are directed to apparatus claims. Thus, argument analogous to those presented above for claims 3 and 4 are respectively applicable to claims 19 and 20.

Allowable Subject Matter

9. Claims 26-30, 33-37, and 40-44 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion


10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent Number: 6,415,012; and a publication to: Bonnet, et al "Multiresolution Reconstruction in Fan-Beam-Tomography".

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL G. MARIAM whose telephone number is 571-272-7394. The examiner can normally be reached on M-F (7:00-4:30) FIRST FRIDAY OFF.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MATTHEW BELLA can be reached on 571-272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


DANIEL G MARIAM
Primary Examiner
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October 2, 2006